PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Before the Board of Patent Appeals and Interferences

In re application of Juergen **DICKMANN** et al.	Confirmation No.: **8976**
Appln. No.: **10/779,454**	Art Unit: **3634**
Filed: **February 13, 2004**	Examiner: **STRIMBU Gregory J.**

For: **DOOR AREA MONITORING DEVICE FOR MONITORING THE SWING AREA OF AN AUTOMOBILE DOOR**

Attorney Docket No.: **3926-063** Customer No.: **41288**

Mail Stop: Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDED APPEAL BRIEF

Sir :

In response to the Notification of Non-Compliant Appeal brief dated November 14, 2008, Appellants submit herewith the Amended Appeal Brief.

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Real Party in Interest:

This application is assigned to Daimler AG of Stuttgart, Germany. The assignment has been recorded by the USPTO on June 5, 2008, at Reel No. 021053, Frame No. 0466.

Related Appeals and Interferences:

No related appeals or interference proceedings are currently pending which would directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

Status of Claims:

Claims 1 and 4-18 are rejected and are under appeal.

The following claims were amended in the response dated August 17, 2007:

Claim 1 was amended by incorporation of the subject matter of claims 2 and 3.

Claims 2-3 were accordingly cancelled.

Claim 4 was amended to correct dependency.

Claim 5 was amended for clarity without changing the scope of the claim.

Claim 6 was amended to independent form by incorporating the limitations from original claim 1.

Claim 11 was amended to depend from claim 1, in view of cancellation of claim 2.

Claims 13 and 14 were amended to remove "preferred" limitations.

Claim 17 was amended to remove a "preferred" limitation and to provide proper antecedent basis.

Claim 18 is amended for ease of understanding.

Status of Amendments:

The Examiner indicated in paragraph 7 of the *Advisory Action* dated August 29, 2007 that for the purposes of appeal the Amendment filed August 17, 2007 would be entered. Accordingly, claim amendments presented after the final Office action are entered in the claims submitted herewith. *A Notice of Appeal* was filed on October 3, 2007.

Summary of the Claimed Subject Matter:

A car door can be damaged when it is opened and impacts an object in it's path. Various devices are known for monitoring the "blind" area of a car door to be opened, and which help to prevent damage to the car door by preventing or retarding opening. However, such devices are complex and space consuming.

The present invention provides a simple door space monitoring device that monitors a door swing area of a vehicle door. The inventive door area monitoring device includes sensors, which monitor or keep under surveillance a substantially planar or two-dimensional monitoring area, in that it includes at least one light source (Fig. 1, ref. no. 3) for emitting a light beam (Fig. 1, "moveable light beam") and at least one photo-receiver (Fig. 1, ref. no. 5) for surveying the two dimensional area being monitored, wherein the light beam emitted by the light source is deflected pivotably by at least one micro-mirror unit (Fig. 1, ref. no. 4; paragraph [0008]). By this pivotable deployment of the light beam in an essentially two dimensional monitoring area, it becomes possible to accomplish a reliable monitoring of the monitoring area in a simple manner. The two dimensional monitoring area is regularly scanned or pivoted together with the door, and paints or illuminates the relevant door swing area to the extent that an object which could come into contact with the door is reliably detected. By the use of a micro-mirror-unit it becomes possible to provide a very compact and flexible door area monitoring device which, due to the great flexibility of the micro-mirrors of the micro-mirror-unit which are precisely pivoted by the control unit, distinguishes itself as a simple, compact and standardized door area monitoring device (paragraph [0008]).

Preferably the micro-mirror-unit is provided with at least one micro-mechanical pivotable planar mirror (original claim 2, now incorporated into claim 1) and additionally a further not planar mirror, and these are associated with the micro-mirror-unit. By the provision of the second, additional, non-planar mirror it becomes possible to provide a substantially flexible and compact sensor means for the inventive door area monitoring device which, as a result of the additional degree or axis of freedom of the non-planar mirror to the repeated deflection of the light beam of the light source, provides the possibility in a simple manner to monitor a number of two dimensional, and in particular non-planar, monitoring areas and to survey these for the presence of objects which represent a danger of collision. Therein it has been found particularly advantageous to design the contour of the non-planar mirror to correspond to the contour of the vehicle door (original claim 3, now incorporated into claim 1). Thereby it becomes possible to translate the two dimensional

non-planar contour of the vehicle door into a corresponding two dimensional, non-planar design of the monitoring area, and thereby to ascertain a reliable indicator regarding the danger of collision of the door with the obstacle. In particular, the possibility is provided by this contour- conforming design of the supplemental mirror, of having the monitoring area extend at a clearly defined distance from the door, wherein the distance over the surface area can be selected to be maintained substantially constant. Therein the distance is so selected that a reliable stopping of the door, in particular in the case of an automatic opening process for the door, is provided (paragraph [00010]).

Accordingly, claim 1 defines a door space monitoring device with which a very simple and reliable two-dimensional monitoring of the area of the vehicle door is achieved.

According to amended claim 6, the micro-mirror-unit and the photo-detector are provided in the area of the pivot axis of the vehicle door, which makes it possible to realize an especially simple and secure monitoring with the help of a suitable two-dimensional monitoring area for the vehicle door.

As described in paragraph [00014] of the specification, it has been found particularly useful to provide the light source, the micro-mirror-unit and the photo-receiver in the area of the pivot axis of the door (the additional feature recited in present independent claim 6), which again leads to a very simple control of the mirror through the control unit, since it is essentially only necessary that the pivot angle of the door be compensated by the corresponding pivoting of the micro-mechanical mirror. An elaborate compensation of substantial, noticeable displacements of the components of the sensor unit relative to the pivot axis need not be of concern, which substantially simplifies the control and therewith the design or construction of the sensor unit. It has been found particularly advantageous to provide the components of the sensor unit on the vehicle door in the area of the pivot axis in an external mirror. In this case a particularly simple control of the mirror is made possible (paragraph [00014]).

Grounds of Rejection to be Reviewed on Appeal

1. Whether or not claims 5, 13-14 and 17-18 are definite under 35 U.S.C. § 112, second paragraph.
2. Whether or not claims 1 and 10 are anticipated by Japanese Patent Publication No. 10-26724 (hereinafter JP 10-26724) under 35 U.S.C. § 102(b).

3. Whether or not claim 4 is obvious over JP 10-26724 and further in view of Hornbeck (US 5,650,881) under 35 U.S.C. § 103(a).
4. Whether or not claims 5-6 and 15 are obvious over JP 10-26724 and further in view of Mochida et al. (US 4,458,446) (hereinafter Mochida) under 35 U.S.C. § 103(a).
5. Whether or not claims 7-8 are obvious over JP 10-26724 and further in view of Haas et al. (US 4,782,224) (hereinafter Hass) under 35 U.S.C. § 103(a).
6. Whether or not claim 9 is obvious over JP 10-26724 and further in view of Underwood (US 4,118,625) under 35 U.S.C. § 103(a).
7. Whether or not claims 11-14 are obvious over JP 10-26724 in view of Hornbeck and further in view of Isogai et al. (US 2003/0090647) (hereinafter Isogai) under 35 U.S.C. § 103(a).
8. Whether or not claims 16-18 are obvious over JP 10-26724 and further in view of Isogai under 35 U.S.C. § 103(a).

Argument:

CLAIMS 5, 13-14 AND 17-18 ARE DEFINITE UNDER 35 U.S.C. 112, SECOND PARAGRAPH

Claims 5, 13-14, and 17-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite.

The claims have been amended to overcome the rejections in the amendment submitted on August 17, 2007 in response to the final Office action. Since the amendment has been entered and the Examiner did not indicate any further rejection under 35 USC 112, second paragraph, in the Advisory action, it is assumed that the rejections have been overcome.

CLAIMS 1 AND 10 ARE PATENTABLE OVER JP 10-26724 UNDER 35 U.S.C. §102(b)

Claims 1 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 10-26724.

The present invention concerns a door space monitoring device that monitors a door swing area of a vehicle door and thus is part of the vehicle and has close relationship with the vehicle door. According to claim 1, the micro-mirror-unit has at least one pivotable planar mirror associated with an additional non-planar mirror and thus realizes the two-dimensional

monitoring area in which a light beam is pivoted as a reflected beam by the pivotable planar mirror and this reflected beam then encounters the additional non-planar mirror, which due to its non-planar design realizes a two-dimensional monitoring area that corresponds to the contour of the vehicle door. The surface of the non-planar mirror corresponds to the contour of the vehicle door and thus a very simple and reliable two-dimensional monitoring area of the vehicle door is achieved. See, e.g., paragraph [00010] of the specification.

JP 10-26724 discloses a multi-point distance measuring system, which has a micro-mirror-unit (DMD 16) (see especially Fig. 1 with description). The distance to a detected object or its extension can be obtained in connection with a consideration of multiple points of the object taking into consideration of a travel time. This multi-point distance measuring system is applied exclusively in connection with a camera (see paragraph [0014] of the disclosure). It is described there that the system is connected with a photo optical system 20 (see Fig. 1), which is part of a camera. Based on the measured distances to different points of a detected object, the camera is adjusted sharply accordingly. Further hint toward the exclusiveness of the application with camera/photograph can be found in paragraphs [0008] and [0012].

Nowhere does JP 10-26724 mention or suggest a reference to a vehicle or door space monitoring device for a vehicle. The merely possibility of determining the distance of an object to multiple points and thus implicitly detecting the presence of the object for a camera with such a multi-point distance measuring system does not provide any hint to integrate this camera multi-point measuring system in a door monitoring device. This system is specifically designed for the application for cameras due to the ability of determining the distance for multiple measuring points at the same time. The technical requirements of temperature stability and mechanical robustness especially vibration rigidity for a camera system are totally different from those for an automobile system for monitoring the vehicle door space. Therefore, it is not obvious to transfer such a camera system to a vehicle door space monitoring device.

Although JP 10-26724 discloses the application of two DMD-chips, each of which has a plurality of individual planar mirrors corresponding to the first micro-mechanical pivotable planar mirror of the present invention, it does not disclose the second additional non-planar mirror.

Clearly, JP 10-26724 only discloses the application of a multi-point distance measuring system for a camera. This reference does not provide any hint toward a door

space monitoring system according to the present invention, especially not concerning the problem of such a system, which is especially marked by a robustness, compactness, and especially vibration resistance. With the door space monitoring system according to the present invention, it is not necessary to determine a distance to a detected object, especially not multi-point distance to the a detected object, but rather it is only necessary to determine the presence of the object. It is, therefore, clear that JP 10-26724 does not provide any hint toward realizing a door space monitoring system.

In addition, JP 10-26724 does not provide any hint toward a combination or replacement of a sensor for another known door space monitoring system. Therefore, JP 10-26724 can also not be combined with another known door space monitoring system.

Since the features of original claims 2-3 have now been incorporated into claim 1 and claims 2-3 were rejected by a combination of JP 10-26724 and Hornbeck, a discussion of Hornbeck is necessary.

Hornbeck discloses a special formation of a micro-mirror-unit, which is also identified as DMD-unit. This special formation concerns the location and rotation of the individual micro-mechanical mirrors of the plurality of small micro-mechanical mirrors, which together form the micro-mirror-unit. Hornbeck does not provide any hint to substitute such a micro-mirror-unit. Especially, there is no hint of applying it as a component of a sensor for a door space monitoring device. The existence and the basic functionality of a micro-mirror-unit is explained in the background of the specification and is assumed to be in principle known. However, Hornbeck does not contain any hint toward the application of the micro-mirror-unit in the direction of the present invention and does not provide any advantage or problem in the direction of the present invention. A combination of Hornbeck with another reference is, therefore, not obvious.

Hornbeck only very generally discloses that the individual mirrors of a DMD-array can have concave and/or convex and/or planar surfaces and does not provide a hint anywhere that the surface should correspond to the contour of the vehicle door. Especially, Hornbeck, just as JP 10-26724, does not disclose anywhere any reference to an automobile, especially not a reference to a vehicle door or a door space monitoring device for a vehicle door.

It is, therefore, clear that a combination of JP 10-26724 and Hornbeck also does not disclose or suggest the specific mirror arrangement for a door space monitoring device with the specific design of a single additional non-planar mirror. Claim 1 is, therefore, believed to

be patentable over JP 10-26724 in view of Hornbeck and since claim 10 is dependent on claim 1, it is believed to be patentable as well.

CLAIM 4 IS PATENTABLE OVER JP 10-26724 IN VIEW OF HORNBECK (US 5,650,881) UNDER 35 U.S.C. § 103(a)

Claim 4 requires that the additional non-planar mirror – with the contour corresponding to the contour of the vehicle door - be mounted to be pivotable, and is micro-mechanically driven. Hornbeck discloses a special formation of a micro-mirror-unit, which is also identified as DMD-unit. Hornbeck only very generally discloses that the individual mirrors of a DMD-array can have concave and/or convex and/or planar surfaces and does not provide a hint anywhere that the surface should correspond to the contour of the vehicle door. Especially, Hornbeck, just as JP 10-26724, does not disclose anywhere any reference to an automobile, especially not a reference to a vehicle door or a door space monitoring device for a vehicle door.

It is, therefore, clear that a combination of JP 10-26724 and Hornbeck also does not disclose or suggest the specific mirror arrangement for a door space monitoring device with the specific design of a single additional non-planar mirror. Claim 1 is, therefore, believed to be patentable over JP 10-26724 in view of Hornbeck and since claim 10 is dependent on claim 1, it is believed to be patentable as well.

CLAIMS 5-6 AND 15 ARE PATENTABLE OVER JP 10-26724 IN VIEW OF MOCHIDA UNDER 35 U.S.C. 103(A)

Claims 5, 6, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 10-26724 and further in view of Mochida.

The feature of claim 6, namely the micro-mirror-unit and the photo-detector are provided in an area of a pivot axis of the vehicle door, is not disclosed by JP 10-26724 or Mochida.

Mochida discloses an ultrasound-based remote control system for a door, in which the ultrasound sensor and the ultrasound receiver are arranged at the front region of the fender on the fender in the mirror "k" (see Figs. 5A & C) or in the handle "a" of the front door and the back door of the vehicle. The front region of the fender or the handle of respective door is not in the region of the pivot axis of the vehicle door, rather is far from the region of the pivot axis of the vehicle door. Especially, the door opening mechanism must be far way from the pivot axis of the door so that it is possible for a simple opening and closing of the door

without overly large expenditure of force. Also, the mirror "k" with the ultrasound sensor and ultrasound receiver at the front region of the front fender is deliberately arranged far away in order to realize a large three-dimensional monitoring region "B" with large angle, thus to possibly safely encompass the opening region of the vehicle door. This can only be achieved by a position at the front end of the vehicle and thus far away from the pivot axis of the vehicle door.

In contrast, the present invention does not use any ultrasound sensor and forms a monitoring area in the manner of a curtain, namely a two-dimensional monitoring area, due to which no distance measuring is required. The present invention further differs from Mochida et al. in that it enables a very compact arrangement under the application of a micro-mirror-unit for pivoting the light source to form a curtain-like monitoring area (two-dimensional) and that the sensor unit is provided in the area of the pivot axis of the vehicle door. This enables a very simple and effective monitoring with help of a curtain-like two-dimensional monitoring area. This is preferred so formed that the distance of the monitoring plane to the door expands with the increasing distance from the pivot axis. These aspects are not disclosed by Mochida.

It is, therefore, clear that the sensors according Mochida, on the one hand, have a completely different sensor principle (ultrasound vs. optical sensors) from that of the present invention, thus applying to clearly different monitoring regions (three-dimensional monitoring region with relative large club opening vs. two-dimensional monitoring region) and, on the other hand, have different positions of the sensor units (far away vs. in the area of the pivot axis of the vehicle door), which lead to completely different effects.

It is, therefore, clear that claim 6 is not disclosed or suggested by JP 10-26724 or Mochida, or a combination thereof. Mochida shows a system for remote control and monitoring of a vehicle door, which concerns a totally different concept from the present invention. Mochida does not contain any hint to apply a different sensor concept other than ultrasound concept, especially not such a specific optical monitoring concept with DMD-devices according to the present invention.

Claim 6 is, therefore, believed to be patentable over JP 10-26724 in view of Mochida. Claims 5 and 15 are believed to be patentable because they are dependent on claim 1.

CLAIMS 7-8 ARE PATENTABLE OVER JP 10-26724 IN VIEW OF HAAS ET AL (US 4,782,224) UNDER 35 U.S.C. § 103(a)

These claims recite that the light source, the micro-mirror-unit and the photo-detector are provided in a common housing (claim 7), wherein within the housing, the micro-mirror-unit is provided between the light source and the photo-detector, and that off-set to the side thereto, at least one of the control unit and the evaluation unit is provided upon a common circuit board.

Haas is cited for teaching a housing for a door monitoring unit. However, in the absence of teaching all the features of claim 1, Haas can no be said to render obvious the present claims.

CLAIM 9 IS PATENTABLE OVER JP 10-26724 IN VIEW OF UNDERWOOD (US 4,118,625) UNDER 35 U.S.C. § 103(a)

Claim 9 requires that at least one photo-detector is a PIN-diode. Certainly, this limitation taken alone may be known, but there is no suggestion in the JP or Underwood reference for the simple and compact door monitoring device of claim 1, wherein the photo detector is preferably a PIN-diode as recited in claim 9.

CLAIMS 11-14 ARE PATENTABLE OVER JP 10-26724 IN VIEW OF HORNBECK AND ISOGAI ET AL. (US 2003/0090647) UNDER 35 U.S.C. § 103(a)

These claims recite a number of preferred features of the door space monitoring device of Claim 1, wherein the micro-mirror-unit is controlled by the control unit to pivot at regular intervals over a predetermined pivot range to produce the light beam passing through the two-dimensional monitoring area (claim 11).

The pivoting over the predetermined pivot range preferably occurs within a time span of less than 5 ms (claim 12), preferably with a time span between two pivot processes of greater than 25 ms and less than 50 ms (claim 13), and preferably with the photo-detector activated essentially only during each n-th pivot process with n being less than 10.

Isogai et al are cited for teaching a controller for a pivot mirror of a monitoring device. However, these references do not teach the compact two dimensional door monitoring device of claim 1.

CLAIMS 16-18 ARE PATENTABLE OVER JP 10-26724 IN VIEW OF ISOGAI UNDER 35 U.S.C. § 103(a)

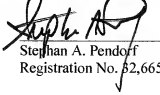
These claims recite preferred embodiments of the invention, namely, that the light source, the micro-mirror-unit and the photo-detector are provided in a common housing together with the evaluation unit; that the evaluation unit is adapted to carry out on the basis of a lookup table stored in a memory, corresponding to a shape or design of the vehicle door, an evaluation of the detected object to determine if the object will damage the door, and that, dependent upon the detection of the object in the door swing area, at least one of the following actions is taken (a) a warning signal is emitted, (b) a further automatic opening of the vehicle door is interrupted, or (c) a further opening of the vehicle door is actively prevented.

These preferred features are preferred embodiments of the basic patentable device defined in claim 1. Accordingly, these dependent claims are also patentable.

Accordingly, it is believed that all rejections should be withdrawn and the present claims passed to allowance.

The Commissioner is hereby authorized to charge any fees which may be required at any time during the prosecution of this application without specific authorization, or credit any overpayment, to Deposit Account Number 16-0877.

Respectfully submitted,



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Date: **December 15, 2008**

Appendix – Claims

1. A door space monitoring device for monitoring a door swing area of a vehicle door, comprising:

sensor means for sensing a presence of an object in the door swing area of the vehicle door,

a sensor-data evaluating evaluation unit, and

a control unit for controlling the sensor means,

wherein a monitoring area sensed by the sensor means is substantially two-dimensional, and wherein the sensor means includes at least one light source for emission of a light beam, at least one micro-mirror-unit for pivoting the light beam and at least one photo-detector for monitoring the two-dimensional monitoring area;

wherein the micro-mirror-unit has at least one micro-mechanical pivotable planar mirror associated with an additional non-planar mirror;

wherein the additional non-planar mirror is shaped such that its contour corresponds to the contour of the vehicle door.

4. The door space monitoring device according to Claim 1, wherein the additional non-planar mirror is mounted to be pivotable and is micro-mechanically driven.

5. The door space monitoring device according to Claim 1 in combination with the vehicle door, wherein the light source, the micro-mirror-unit and the photo-detector are provided

- on or in an external mirror which is attached to the vehicle door, or
- on or in a vehicle door handle.

6. In combination with a vehicle door, a door space monitoring device for monitoring a door swing area of the vehicle door comprising:

sensor means for sensing a presence of an object in the door swing area of the vehicle door,

a sensor-data evaluating evaluation unit, and

a control unit for controlling the sensor means,

wherein a monitoring area sensed by the sensor means is substantially two-dimensional, and wherein the sensor means includes at least one light source for emission of a light beam, at least one micro-mirror-unit for pivoting the light beam and at least one photo-detector for monitoring the two-dimensional monitoring area;

wherein the light source, the micro-mirror-unit and the photo-detector are provided in an area of a pivot axis of the vehicle door.

7. The door space monitoring device according to Claim 1, wherein the light source, the micro-mirror-unit and the photo-detector are provided in a common housing.

8. The door space monitoring device according to Claim 7, wherein within the housing, the micro-mirror-unit is provided between the light source and the photo-detector, and that off-set to the side thereto, at least one of the control unit and the evaluation unit is provided upon a common circuit board.

9. The door space monitoring device according to Claim 1, wherein the at least one photo-detector is a PIN-diode.

10. The door space monitoring device according to Claim 1, wherein light output of the light source controlled by the control unit is adjusted according to the degree of pivoting of at least one micro-mechanical mirror of the micro-mirror-unit.

11. The door space monitoring device according to Claim 1, wherein during a pivot process, pivoting of the at least one micro-mechanical planar mirror of the micro-mirror-unit is controlled by the control unit to pivot at regular intervals over a predetermined pivot range to produce the light beam passing through the two-dimensional monitoring area.

12. The door space monitoring device according to Claim 11, wherein the pivoting over the predetermined pivot range occurs within a time span of less than 5 ms.

13. The door space monitoring device according to Claim 12, wherein between two pivot processes a time span of greater than 25 ms and less than 50 ms occurs.

14. The door space monitoring device according to Claim 12, wherein the control unit is so designed, that the light source and the photo-detector are activated essentially only during each n-th pivot process with n being less than 10.

15. The door space monitoring device according to Claim 1 in combination with the vehicle door, wherein the light source, the micro-mirror-unit and the photo-detector are so arranged, that the distance of the two dimensional monitoring area from the vehicle door essentially also increases with increasing distance of the two dimensional monitoring area from the pivot axis of the vehicle door.

16. The door space monitoring device according to Claim 1, wherein the light source, the micro-mirror-unit and the photo-detector are provided in a common housing together with the evaluation unit for distance measurement by a phase delay process.

17. The door space monitoring device according to Claim 16, wherein the evaluation unit is adapted to carry out on the basis of a lookup table stored in a memory, corresponding to a shape or design of the vehicle door, an evaluation of the detected object to determine if the object will damage the door.

18. The door space monitoring device according to Claim 1, wherein dependent upon the detection of the object in the door swing area, at least one of the following actions is taken:

- a warning signal is emitted,
- a further automatic opening of the vehicle door is interrupted, or
- a further opening of the vehicle door is actively prevented.

Evidence Appendix:

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or any other evidence has been entered by the Examiner and relied upon by appellant in the appeal.

Related Proceedings Appendix:

No prior or pending appeals, interferences or judicial proceedings are in existence which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in this appeal. Accordingly, no copies of decisions rendered by a court or the Board are available.